

MEETING MINUTES (FINAL)

CITY OF TUCSON HABITAT CONSERVATION PLANS

Technical Advisory Committee (TAC)

Wednesday, July 16, 2008, 1:00 – 4:00 p.m.

U.S. Fish & Wildlife Service, Tucson Field Office

201 North Bonita Ave, Suite 141

Tucson, AZ 85745

ATTENDEES

City of Tucson (COT) Habitat Conservation Plans (HCPs) Technical Advisory Committee (TAC) members present:

Dennis Abbate (Arizona Game and Fish Department – Research Branch)

Marit Alanen (United States Fish and Wildlife Service)

Rich Glinski (Arizona Game and Fish Department – *retired*)

Trevor Hare (Coalition for Sonoran Desert Protection)

Guy McPherson (University of Arizona – School of Natural Resources)

Other Attendees present:

Amanda Best (Westland Resources, Inc.)

Jamie Brown (City of Tucson – Office of Conservation and Sustainable Development)

Mike Cross ((Westland Resources, Inc.)

Locana de Souza (Arizona Game and Fish Department)

David Jacobs (Arizona Attorney General's Office)

Leslie Liberti (City of Tucson – Office of Conservation and Sustainable Development)

1. Welcome, introduction, and TAC Charter

2. Review of TAC meeting minutes: June 18, 2008

The minutes were approved with edits and corrections from Locana, Marit, Dennis, and Trevor.

3. Updates

Preliminary Draft HCP review schedule.

Jamie reminded Technical Advisory Committee (TAC) members of the August 22 deadline to provide comments on the Avra Valley Preliminary Draft HCP. He requested that TAC members submit these electronically within the Microsoft Word document. *[Action Item: Regarding the Preliminary Draft HCP review by TAC members, Jamie will redistribute the sheet with brief instructions].*

Off-road vehicles and City of Tucson (COT) washes.

At a previous meeting, a TAC member asked about the City's ordinance prohibiting vehicles off of roadways within 0.25 mile of a structure. Specifically, the question was whether or not the wash had to have the regulations posted for this ordinance to be enforceable. Leslie asked a City attorney about this and was told that signage is not necessary for the ordinance to be enforceable. Trevor asked if the ordinance could be changed such that all washes could be included in this prohibition of vehicles, regardless of distance from a structure. He said that there are currently few, if any, structures near many of the washes in the Greater Southlands and so the current ordinance would not prohibit vehicles from washes. Leslie said that that could be a recommendation made by the TAC. Trevor recommended that TAC members contact their City Council Members and request the change. Trevor said that he thinks Pima County prohibits off road vehicle use within all wash channels and, therefore, for consistency, the City of Tucson (COT) should have a similar prohibition. *[Action Item: OCSD staff will distribute Pima County's ordinance regarding off road vehicles and washes].*

City of Tucson Sustainability Framework

Leslie reported that on Tuesday, July 8, the COT Mayor and Council unanimously adopted the Office of Conservation and Sustainable Development's (OCSD's) Framework for Advancing Sustainability. Leslie said that this gives OCSD authorization to create internal task forces for the purpose of creating a sustainability plan, which will guide internal operations. She said that Arizona State law requires that General Plans must be revised and approved by voters every ten years. Thus, by November 2011, a revised and approved General Plan must be in place. As part of this revision, the Mayor and Council's intent is to make sustainability the central, organizing concept. OCSD is working with the COT Department of Urban Planning & Design to facilitate this. Also, as part of adopting the Sustainability Framework, Mayor and Council authorized creation of a climate change committee. This will be a citizen action committee that will help develop a climate change mitigation and adaptation plan. The committee will investigate ways the COT can reduce current emissions outputs as well as deal with emissions previously emitted but remaining in the air. Leslie said that there will be a broad range of citizen representation, from experts in food security to experts in health effects of climate change. Committee members can, and are expected to, create subcommittees, which will only require one committee member per subcommittee. The remaining subcommittee members will come from outside of the climate change committee.

Rich asked Leslie if there is a similar structure in Pima County's government and, if so, who Leslie's counterpart is. Leslie said that Tedra Fox is the Sustainability Manager for Pima County. Her office recently released a draft Sustainability Strategic Plan. Leslie said that Pima County's plan is slightly different than the COT's. One example is that the COT's Sustainability Framework will be directly linked to the budgeting process and another is that Pima County's Plan is focused entirely on internal operations.

Greenhouse Gas Inventory

Leslie reported on preliminary results of a greenhouse gas emissions inventory on which OCSD and partners have been working. She said that from 1990 to 2007, greenhouse gas emissions have increased by 28% within the COT limits. The commitment under the Mayor's Climate Protection Agreement is to reduce greenhouse gas emissions by 7% below 1990 levels. Thus, a 35% reduction is needed to meet this Agreement by 2012. In Eastern Pima County as a whole,

there was an almost 50% increase between 1990 and 2007. David asked if this was a gross or per capita increase to which Leslie responded “gross.” Leslie said that these are gross emissions. Trevor asked if major producers of greenhouse gases were identified as part of the inventory. Leslie said that sectors have been identified, but there are some gaps. For example, they were unable to gather data from Portland Cement, Tucson International Airport, or Davis-Monthan Air Force Base. In addition, there are some gaps from a regional perspective, such as propane use. She said that the inventory effort will evolve over the years, but this was an effort to complete something by the end of the fiscal year.

University of Arizona Water Conservation Proposal

Trevor asked if Leslie could comment on the water conservation proposal, which would require the amount of a customer’s water bill which declined due to the customer’s conservation actions go directly to restoration efforts. Leslie said that the idea originated at the University of Arizona’s Water Resource Research Center. She added that the biggest hurdle to the proposal is the fact that metering occurs in units of hundred cubic feet (CCF) [1 CCF equals 748 gallons] and not gallons. As such, a water customer could reduce consumption by a large number of gallons and not see a change in the CCF because it is rounded up. Another challenge is tracking conservation on an annual basis given fluctuations of use throughout the year (e.g., would credit or debit be applied from one month to another if conservation levels change?). Given the logistical hurdles, Leslie said that she thinks Tucson Water’s position might be to identify a water source for restoration if that is what the community wants rather than have a complicated system of connecting conservation to restoration. Trevor said that he didn’t like that answer and wondered if OCSO would want to get involved in. Leslie said that OCSO has been involved in the discussion. Trevor asked if the authors of the proposal are working to refine it and make it more feasible. Leslie said that she didn’t think so.

Ecological Monitoring and Pima County

Jamie reported that he recently spoke with Brian Powell regarding Pima County’s ecological monitoring effort. Brian said that he is currently working on a report recommending where species-level monitoring will be appropriate and where ecosystem level and threats monitoring will be appropriate. At the same time, Brian and his team are developing a broader approach to the ecological monitoring program that focuses on addressing the biological goals of both Pima County’s Sonoran Desert Conservation Plan and the Multi-species Conservation Plan. The most comprehensive program would be designed with the entire SDCP in mind and the minimal program would focus solely on the Multi-species Conservation Plan for Endangered Species Act compliance. If the COT is going to focus only on species-level monitoring, then Brian recommends coordination with Pima County after both the COT and Pima County know which species they intend to monitor. That way, there can be discussion over whether the same protocols can be used so that the data can be shared. If the COT wants to incorporate habitat or ecosystem-level monitoring, he recommends meeting in the near term as his team is considering ecosystem and habitat approaches in the coming months.

Rich recommended coordinating a joint meeting regarding ecological monitoring after the October 1 TAC meeting with Dennis Kubly in which adaptive management will be discussed. Trevor agreed and said that Brian’s report will help the TAC better understand Pima County’s proposed ecological monitoring strategy. He said that it will be important for there to be a single

repository of ecological monitoring data from the local jurisdictions as well as from the land management agencies. Leslie added that discussions on climate change and HCPs will help inform approaches to ecological monitoring.

4. Discussion

Pima Pineapple Cactus: Discuss written responses from botanists, *et al.*

Jamie distributed a document summarizing responses received, along with several points of agreement and disagreement. [Note: B. Schmalzel's responses were not included as they were received 1 hour and 15 minutes before the meeting]. To start the conversation, Jamie reviewed the points of agreement and disagreement for several of the questions. With regard to question 1, Trevor noted that both C. McDonald and B. Schmalzel recommended protection of PPC at multiple spatial scales. With regard to question 3, it was noted that B. Schmalzel was the only respondent to state that the planning area is relatively unimportant to the rangewide conservation of the species. This statement was based on B. Schmalzel's PPC population estimate of 100,000 to 150,000 individuals throughout the range. The TAC referred to the U.S. Fish and Wildlife Service's (USFWS's) PPC 5-year Review [Federal Register Notice 70 FR 5460. Also available at: <http://www.fws.gov/southwest/es/arizona/pima.htm>] in which that estimate was questioned by all the reviewers because of faulty methods for obtaining that estimate. Leslie said that according to the USFWS 5-year Review, the samples were not selected at random and so there was a perceived inflation of the population estimates because individual PPC can occur in high-density clusters. Also, less than 2.5 percent of the range was sampled.

Trevor asked Mike how many of B. Schmalzel's PPC surveys occurred in the HCP planning area. Mike said that he didn't know, but that more surveys are likely to have occurred in the HCP planning area since more development, and therefore more need for biological inventory, is likely to occur in the HCP planning area than other parts of the PPC range. Trevor asked if there were any reports on these surveys and Mike said that Westland Resources, Inc. reports to the client. He added that no federal or state permits are required for PPC surveys on private property. In reference to the PPC population estimates, Dennis said that they are highly variable depending on the parameters used and the conditions under which the surveys occur.

Regarding Question 5 about assessing the health of the PPC population, Dennis said that he is interested in knowing what criteria the respondents used to make their assessments. When considering a healthy saguaro population, for example, Dennis said that he looks for multi-aged individuals and recruitment. Dennis asked Mike if B. Schmalzel had done any work to assess the health of the PPC population. Mike said that B. Schmalzel has studied PPC recruitment but has not yet published his findings.

Guy said that the threshold PPC density is unknown as well as the number of individuals of other species of cactus necessary to maintain the population of pollinators for sustainable pollination of PPC. He said he thinks those are critical issues as other cactuses serve as a temporal bridge between seasons for the bees that pollinate the PPC. Trevor said that he thinks there is a good experimental arena to answer some of these questions since he thinks it will be twenty years

before there is significant development in the area. He said that agreeing to a research program in the HCP planning area could be a good step to receiving credit from the USFWS for the HCP.

Marit said that at the end of the PPC 5-year Review, there is a list of recommended actions. Leslie read the recommendations:

Given the limited resources available for conservation efforts for this species, priorities should be:

- 1. Acquisition and protection of habitat*
- 2. Additional survey work to locate new populations*
- 3. Continued funding for the on-going demographic study*
- 4. Continued effort to delineate habitat*
- 5. Estimate the amount of habitat needed for recovery*
- 6. Derive a population estimate for the species.*

Marit said that there is some discussion in the PPC 5-year Review suggesting that protecting what habitat currently exists may be the best option to pursue given limited resources. However, she noted that she was not implying that PPC research is not a priority. Trevor said that he hopes the Technical Advisory Committee will recommend protecting habitat and encourages the COT, Pima County, and others to consider research questions that come out of this PPC discussion.

Referring to question 3, Leslie asked what the Technical Advisory Committee consensus is on the importance of the HCP planning area to the overall range of the PPC. Trevor said that, because of the horseshoe-shaped distribution of the PPC, there could be minor genetic differences between the populations on either side. If so, individual PPC should be distributed across the entire range to maintain genetic heterogeneity. Guy said that he thinks the HCP planning area is somewhere between extremely important and critical to the PPC for the same reasons that Trevor mentioned. He added that preservation in place of PPC and any other cactus species in proximity to the PPC is imperative.

Reflecting back what she was hearing from the TAC, Leslie said that it sounded like protecting an area that may be genetically variable from another area to form a “bridge” is an important consideration. She asked for clarity on what would be bridged to which Guy said the populations in the Altar Valley. She said that she was under the impression from previous TAC meetings that connectivity on the north side of the Sierrita Mountains had been severed because of development along the Ajo corridor. Trevor said that he thought it was a political determination to assert that the Ajo corridor is no longer functional. Trevor said that he thinks there is a viable corridor south of the Sierrita Mountains, through the mines, and into the Santa Rita Experimental range. Leslie said that one question to get responses from Mima Falk (USFWS) and the respondents is “Are there viable east-to-west PPC corridors north of the Sierrita Mountains and, if so, where would they be?”

Rich said that if no viable corridors exist, the question about the HCP planning area’s level of genetic importance is moot. He added that he agrees with Dennis about the importance of answering the question about the health of the population in the HCP planning area. He said that

many equate health with density. However, he said he liked S. Rutman's comments about why she considers the southwest corner of the HCP planning area most important as it connects to the Santa Rita Experimental Range (SRER) area. This connection creates a larger area for conservation. And, if there is a larger area preserved as PPC habitat, then the population has a greater chance of being healthy. Rich said that the development that will occur within the Greater Southlands HCP planning area will change the density and there will be a threshold at which there will be no viability.

Trevor said that this assumes that the "bridge" on the south side of the Sierrita Mountains will be permanently protected. However, there is currently high development pressure in that area. So, he said he hopes that Pima County is taking the issue of the PPC "bridge" as seriously as the TAC is. He added that part of the problem is not knowing what other jurisdictions are doing, including the Town of Sahuarita (Sahuarita) and Pima County. Leslie said that Sahuarita is considering a Comprehensive Plan amendment for a section south of Sahuarita Road. A Comprehensive Plan amendment would include a land use plan for the area, followed by annexation. Rich asked if Sahuarita is engaged in any PPC conservation to which Leslie responded that she was not aware of any. Trevor added that, because there is no prohibition on "take" if the PPC is the only listed species occurring in Sahuarita's limits, then Sahuarita does not need an HCP.

Leslie said that one of the consistent recommendations by the respondents involves creating a PPC reserve or series of reserves. Where these should be located depends on what is to be maintained. Therefore, she said that if the "bridge" is important strictly for maintaining genetic variability, this implies that the connections to the south are most important because that is where the bulk of the population on the east side of 1-19 is located. However, she asked if the area on the eastern side of the HCP planning area is more important because of the overlap with needle-spined pineapple cactus individuals and habitat. If both are important, she said that a series of smaller preserves would likely be necessary. She asked if there is a clear driver indicating that a large preserve would be most suitable over several smaller scale preserves, or vice-versa. Trevor said that the PPC is a small, highly localized cactus. He mentioned concepts discussed at previous TAC meetings. These included maintaining connectivity by establishing many 5, 10, or 20-acre set asides, *in-situ* plant protection within large developments and protecting a variety of other cactuses to attract PPC pollinators.

Trevor said that regardless of what is taking place west of the HCP planning area, the COT's conservation strategy would connect to the other jurisdictions. He said that, hopefully, the other jurisdictions would continue with the reserve network across the landscape into the Altar Valley where there are other protected areas. Leslie said that this involves assumptions of what other jurisdictions will or will not do. Trevor said that Pima County is likely required to engage in some PPC protection. Guy said that he didn't think that the TAC should assume that other jurisdictions will not provide any habitat protection for PPC. Leslie said that there is an upper limit to how much conservation will occur in the HCP planning area and so it is really important for the TAC to determine the best locations, in general, for PPC conservation. Leslie asked if there is sufficient risk to depending on preserving the east to west corridors from the Santa Cruz Valley to the Altar Valley. And, if so, perhaps habitat preservation should focus elsewhere. Trevor said that there is time to answer the question because of the time until major development

will occur in the HCP planning area. He said that it sounds like Sahuarita will know where development footprints will be before the COT knows where its development footprint will be. If so, then the COT should be able to tell within the next 10 years whether or not Sahuarita will include PPC in development decision-making. This would give the TAC time to design a reserve system that meets criteria of protecting populations in place and allowing genetic interchange between east and west. Leslie said that it sounded like Trevor was suggesting that the TAC continue some kind of informal planning process until those questions are answered and at the point when they are answered and addressed, submit an HCP permit application.

Trevor suggested considering target acreages for an indeterminate PPC preserve configuration that might meet both the TAC's needs as well as the USFWS's requirements. Leslie asked TAC members what the target acreages would be. Trevor asked Leslie what the total acreage of PPC habitat south of I-10 and within the HCP planning area is. Leslie said she thinks that this area includes roughly 85,000 acres of PPC Priority Conservation Area as designated by Pima County. However, she would need to look at the Preliminary Draft Greater Southlands HCP to confirm this. Trevor suggested protecting ten percent of this PPC Priority Conservation Area (~8,500 acres), consisting of a 3,000-acre preserve; ten, 300-acre preserves; and one hundred, 30-acre parcels. However, he said that he wasn't sure how this would be received by botanists, Arizona State Land Department staff, COT staff, or others. Leslie said that the TAC needs to develop recommendations based on biology. She asked if there is a different direction the TAC wants to go in terms of recommendations or if there are additional questions that need to be asked and responded to before finalizing any recommendations.

Guy compared the PPC to the jaguar as both are cryptic and, given enough time, could be found nearly anywhere in their respective ranges. However, in any point in time, each species only occurs in certain areas. Also, both species' incredibly low densities make them difficult to manage. He said that unless the entire HCP planning area is protected, anything the TAC does could be detrimental to the PPC.

Rich asked about the distance between the Santa Rita Experimental Range (SRER) and the dense clusters of PPC on the east side of the HCP planning area. Trevor said that the boundary of the SRER is only about six miles from the east side of the HCP planning area. Rich said that, taking into account what Guy said about the species' ability to occupy all parts of the HCP planning area, focusing management on the southern part of the planning area allows for connectivity with the SRER. Therefore, this also provides connectivity with the populations on the west side of the horseshoe. Rich suggested conserving five to ten thousand acres in this area as the only conservation measure recommended by the TAC for the PPC. He said that this would mean that the PPC individuals in other parts of the HCP planning area would not be protected in a large preserve. He added that the area where he proposes a reserve has less erosion than lands in the HCP planning area to the north and is, therefore, more stable. Trevor said that the northwestern portions of the HCP planning area are classified by the COT as a "Future City" growth area. Thus, not as much habitat is likely to be protected there anyway.

Marit expressed concern over TAC members basing PPC habitat protection on the ten percent figure, which was only a brainstorm and not based on biology.

Trevor said that he likes the idea of a dispersed reserve system because the species is small and this would allow for risk to be spread throughout the HCP planning area. Rich asked how this would address pollination. Trevor said he agrees with recommendations by C. McDonald and B. Schmalzel in terms of *in situ* conservation, getting buy-in from the community, protecting multiple species of cactus, and prohibiting non-native plants in the landscape. Rich said that Trevor was counting on controlling human behavior. Trevor said that his first question to C. McDonald and B. Schmalzel is whether or not they think the community will have any affinity for the PPC. But, he said that he thinks some people will, referring to the large membership of the Tucson Cactus and Succulent Society. In reference to the idea of instilling the importance of PPC on individuals moving into the Greater Southlands, Marit said that she didn't think the USFWS would consider that conservation approach adequate unless it could be shown that individual behaviors that favor the species could be enforced.

Trevor said that he thinks a host of conservation ideas would be the best approach, including accepting that some individual PPC will be destroyed, establishing large (over 1,000-acre) reserves, establishing a couple of section-sized (640-acre) reserves, a couple of ten-acre reserves, and connection into the SREC. Rich said that if the TAC emphasizes conservation of a large area in the southwestern corner, other areas could be discovered over the next ten to twenty years through adaptive management. These would be areas of high-density PPC populations— whether they be parks or open space – that would be compatible with PPC conservation areas and they would be actively pursued by surveys over time. Rich said the focus should be on conservation of the lands adjacent to the SREC.

Trevor said that hopefully the eastern edge of the HCP planning area will be protected because of its importance for connectivity. He said that as areas of the planning area are developed, developers are going to need mitigation banks. In 15 to 20 years, the PPC mitigation banks in the Altar Valley may be at capacity and so there will be a need for a PPC mitigation bank or banks in the Greater Southlands HCP planning area.

Leslie said that her understanding is that the Arizona State Land Department (ASLD) is, at least, considering mitigation banks as an option. David said that ASLD discussions of mitigation banks have focused on areas west of I-19, such as in the Altar Valley, but that doesn't mean siting PPC mitigation banks in the Greater Southlands HCP planning area is not possible. Trevor asked if such mitigation banks would involve someone proposing a lease or purchase agreement with ASLD for the specific purpose of mitigation banking. David said yes.

Leslie asked the TAC about their opinions on mitigation banking in the Altar Valley. Trevor said that he doesn't like that option. Trevor wondered if the PPC in the HCP planning area are part of a different deme than those in Altar Valley. In response to a question from Trevor, Amanda said that B. Schmalzel looked at morphometric differences across a very large area beyond Pima County's boundary. Trevor asked Amanda if she thought B. Schmalzel had collected enough data to run a Principal Component Analysis within just the Pima County area. Amanda thought that it could probably be done if funding could be found. Mike said that he could ask B. Schmalzel if it is feasible. Trevor said that the TAC should assume that the populations differ genetically until the Committee has data to support or refute this claim. That is, the TAC should not consider PPC mitigation solely occurring in the Altar Valley until this claim is refuted.

Trevor asked Marit what the USFWS would consider a lower threshold of PPC habitat protection acres. He used the example of a developer preserving twenty percent of the land around a PPC population and asked what size the protected area would need to be to receive credit from the USFWS. Marit said that it is a difficult question and one she couldn't answer at the moment.

Leslie said that one idea is to go back to the “backwards L” concept that the TAC had discussed previously for the protection of other HCP covered species. The “backwards L” consists of the southern and eastern portions of the HCP planning area, delineated by the foraging habitat for the lesser long-nosed bat. She said that the TAC could present a conservation proposal to the PPC question respondents based on the lands within the “backwards L.” This proposal could include describing acreage amounts for a dispersed reserve system, *in situ* conservation between the reserves, some limitations to avoid invasive species in those areas, and encouraging compatible multiple use in areas with dense populations. Feedback on this proposal would be requested along with the question of how the respondent would structure PPC conservation under these parameters.

Trevor suggested also sharing with the PPC question respondents the number of acres of land planned for development along with the currently required habitat mitigation ratio. Trevor asked Mike what the mitigation ratio is for PPC habitat. Mike said that it is generally one acre of PPC habitat for every one acre of PPC habitat destruction. Trevor said that protecting half of the PPC habitat in the HCP planning area is unrealistic. Leslie said that the amount of PPC habitat depends on who one talks with. She noted that Pima County has modeled much of the Greater Southlands as PPC habitat. Trevor asked if there was good distribution throughout the habitat. Leslie said that the north-central area of modeled habitat does not contain many individuals according to M. Baker's surveys. Trevor asked Amanda about the density of PPC within the Swan Southlands development. Amanda said that only old PPC survey data exists and they have not re-surveyed yet. She said that for the developer to get approval of the tentative plat, the area must be re-surveyed for PPC. Trevor said that the Swan Southlands used to be a PPC mitigation bank in the area until Pima County sold the property.

Leslie said that we know that developers will be required to survey for PPC per the COT's Native Plant Preservation Ordinance (NPPO). As part of this, developers must identify 100 percent of the individual PPC on-site. Therefore, given these required surveys, the COT will know where high-density PPC areas are and can work with that in the context of development. She said that what is not known is how developers will comply with the NPPO. She said that under the NPPO, developers can set-aside 30 percent of the site or they can mitigate for removed individual PPC. However, even if PPC are transplanted on-site, one to one mitigation is still required. And, to her knowledge there are not many PPC plants for sale in nurseries given horticultural restrictions. Mike said that PPC are easy to grow and that germination occurs using seed collected on-site. Leslie asked Mike how long Westland Resources, Inc. grows PPC in a greenhouse before they are returned to the site for transplanting. Mike said it was three years in one case. Leslie said a question then is if that is the approach that developers take (collect seed on site, propagate in nursery for 3 years, transplant to site), what guarantees will be needed to ensure that it is being done properly. Mike said that in the case he is referring to, he believes that the applicant had to post a performance bond with Pima County.

Leslie asked if there is anything else that TAC members wanted to add to the PPC conservation scenario to be included in a draft proposal. Trevor said that he recalled a disturbing story in which biological consultants involved in a large development project dug up and moved all of the PPC. But, at the last minute, the developer changed the plat to avoid disturbing where the PPC were originally located before being moved. Trevor said that this would be something to avoid as these individuals ended up in a greenhouse where they died.

Leslie said that unless there are other constraints, any development in the HCP planning area can move 100 percent of the PPC on-site to some portion of the site that is not going to be developed. In addition, the developer can propagate PPC from seeds collected on the site to meet the mitigation requirements. Leslie asked if the TAC had any questions or reservations about this. Trevor said that that one question is whether or not the cactus will contribute to the regional gene pool. Dennis asked about the timing and if PPC are transplanted on site first and then the seeds are gathered for propagation. Mike said that seeds are collected in the field from fruits if they are available. Often, Westland Resources, Inc. staff collect seeds from jackrabbit pellets because jackrabbits usually eat the fruits before they can be collected. This way, the seeds are collected before the plants are moved. Dennis said it would be important to know the protocol for seed collection and knowing when the PPC are fruiting or when the seeds will be available either within pellets or the fruit. Guy said that many more seeds than excavated mature plants must be collected to mitigate appropriately. And, many nursery propagated plants need to be transplanted to have just one survive. He used the example of the number of acorns produced by a single oak tree. In southern Arizona, there are declining populations of oak trees and so millions of acorns are insufficient to produce one plant. So, we are talking about hundreds of thousands of seeds for every plant that is excavated.

Marit said that she thinks that some of the respondents brought up questions of the unknown implications of planting a higher density in some areas, which may affect the *in situ* plants. So, it is hard to know what the long-term repercussions might be. Leslie agreed that the density question is important. She said that for a site of a certain sized area, they could have a large number of PPC, set-aside ten percent of the property and in order to transplant all the PPC on-site as well as transplant the necessary mitigation PPC from the greenhouse, PPC would need to be transplanted at very high densities. Leslie asked the TAC if there is an upper threshold on density or if there is some way to put “side bars” on how they should be spatially arranged. Rich said that he didn’t think there was any research conducted to answer that question. Marit said that it might be somewhat site specific and to give “side bars” to apply everywhere may be difficult.

Dennis asked if we have example areas where they occur in the densest configurations, and, if so, what that density is. Marit said that the area where the Corona de Tucson development now is had an extremely high density of PPC. Mike said that in areas with high-densities of PPC that he has observed they can become more vulnerable to weevils as the weevils are able to walk from plant to plant.

Trevor referred to responses to question four in which all of the respondents recommended conserving habitat and individuals don’t matter that much. He said that he thinks the TAC needs to concentrate on protecting large areas. He added that a large area of land for this small species

is not that large. If densities are one plant per 20 acres, then if there is a 200-acre preserve, then 10 or so cacti are protected.

Jamie quoted the USFWS 5-year Review in which C. McDonald's master degree thesis was referenced. "Results from this work indicate that PPC plants need to be within approximately 600 m. of each other in order to facilitate effective pollination. PPC plants that are located at distances greater than that from one another become isolated." Jamie added that there were several mentions by respondents of jackrabbits being important seed dispersers. He wondered if discussion of what constitutes jackrabbit habitat needs to be considered or at what threshold of development density one stops seeing jackrabbits.

Dennis asked if jackrabbits are the only animals that eat PPC fruits. Mike said that unlike other PPC fruit eaters such as cottontail rabbits, jackrabbits don't grind the seeds and so seeds collected in jackrabbit pellets are still viable. Rich said that in urbanizing areas, packrats may become more common than jackrabbits. Trevor mentioned his work conducting cactus ferruginous pygmy-owl surveys in northwest Tucson where housing density was one house per 3.3 acres and said that he didn't see jackrabbits. Mike said that he lives in northwest Tucson and he does not see many jackrabbits. Dennis said that that is another issue then if small reserves are created surrounded by urbanization, which is more suitable for packrats and other rodents. He said that a situation could be created in which there are increased PPC predators despite the gross environmental conditions. Leslie asked Guy if the concept of jackrabbits being the principal PPC seed disperser is universally agreed upon. Guy said that it is not universally agreed upon and said that he suspects that insects move the seeds around but he hasn't seen any good data. Trevor said that it is easier to collect jackrabbit scat than insect scat to extract PPC seeds.

Dennis asked if anyone knows the conditions for natural PPC seeds germination (e.g., are they on the surface or are they buried?). Mike said that the seeds are on the soil surface when they germinate. Trevor asked Mike if B. Schmalzel has been able to germinate PPC seeds by tumbling or scoring them or if he germinates only from seed collected from jackrabbit scat. Mike said that B. Schmalzel gets the seed where he can get them (e.g., from fruits, jackrabbit pellets). Mike said it is much easier to collect seeds from the fruits than from jackrabbit pellets. Fruits have about 90 seeds in them and the plant will have several fruits. Mike said that the one time he collected jackrabbit pellets for PPC seeds, he collected 150 jackrabbit pellets over a half day and found only 17 PPC seeds.

Guy said that he thinks Patricia Roller did some work with scarification. He said that it is obviously unnecessary and may be detrimental but he wasn't sure about that. Trevor said that seeds sitting on the surface are probably not viable for very long with rain action, wind, erosion and other things.

Leslie said that going back to the point about research, she said that it would be helpful to have a list of the most important specific research questions that should be answered in order to complement the proposal and ask these of the PPC question respondents. She said she was thinking about specific questions related to the HCP planning area. Trevor said that the important question for him is "What are the genetics across the PPC range and do we need connections or are they the same exact plant?"

Marit referred to a morphological analysis that was underway by M. Baker in 2007. Based on her reading of the 5-year review, Marit noted that there were criticisms of the work of both M. Baker and B. Schmalzel as they did not take measurements of enough features of the PPC. She said that M. Baker was going to go back and take additional measurements. Guy said that nobody is looking at the fine scale differences between plants within the Santa Cruz Valley and the Altar Valley. Trevor noted B. Schmalzel's response regarding his surveys of PPC in both the Altar and Santa Cruz Valleys, with densities ranging from 1 plant per 10 acres to 100 plants per acre. Given this, Trevor asked Mike if B. Schmalzel looked at soil differences as well as topography and aspect to investigate why high PPC density sites occur where they do. Mike said that he has a lot of ideas that he is still developing but that geomorphology could be very important. He said that he can show B. Schmalzel a soil map for a property and B. Schmalzel is getting to the point where he can provide a pretty accurate estimation of the densities likely to be encountered. Trevor said that work from this could be very important in helping to determine a reserve in terms of location and size.

Leslie said that it would be nice to pull together a list of all the ongoing PPC research. She asked Mike if B. Schmalzel would be willing to at least provide a brief summary of what he is working on. Mike said that he would ask him. Leslie referred to a demography study taking place in the Buenos Aires National Wildlife Refuge funded by the National Fish and Wildlife Foundation. According to the USFWS PPC 5-year Review, six demographic plots were established in Altar Valley in 2002, the first year of monitoring results have been summarized and there was funding for 2006 for additional work, but it was unclear who was doing this work. *[Action Item: OCSD staff ask USFWS staff about the results of the PPC demographic study in Altar Valley. Action Item: OCSD staff create a list of ongoing PPC research.]*

Leslie said that what she is hearing is to focus on the “backwards L,” with some kind of dispersed reserve system – although there was disagreement as to whether the dispersed reserve system was the best approach – but this would give the respondents something to evaluate. Conservation would be part of development, with connections between reserves. Other measures should include avoiding non-native, invasive species and establishing compatible multiple use areas. The proposal should include information about the COT's NPPO and what that means for configuration of PPC within an area that is being developed. In addition, from when the permit is approved to a certain point in time, fund research. She said that certainly what is important for the species as a whole is important, but that it would be also good to know about research questions with just the lands as part of the “backwards L” in mind. She added that it would be good to mention considerations beyond the planning area such as the possible annexation by Sahuarita between I-19 and the HCP planning area.

Marit asked if the concept of maintaining connectivity on the west side had been abandoned. Leslie said that she was just referring to what she heard as the most commonly repeated concept during the meeting. Leslie asked if there is a second proposal that should be drafted and sent to the PPC question respondents with the same level of detail. Or, she asked if just one proposal should be sent along with a list of some of the concerns that may be part of that proposal (e.g., a lack of connection to the west of I-19) and ask for comments on these concerns. Marit said that she liked the approach of asking what the respondent's thoughts are.

Marit asked about the shape of Pima County's PPC Priority Conservation Area. Trevor said that it generally forms a large horseshoe shape around the COT and the Sierrita Mountains. It includes all of Altar Valley. Trevor said that the lands north of the Sierrita Mountains around Ajo Way may have been "written off" by Pima County because that is one of Pima County's urban growth areas. He said that Pima County recently completed a plan amendment and has been issuing many building permits along Ajo Way. Trevor said that this gets back to the earlier question of whether or not conservation is precluded on the top of the PPC's range. He thinks that's a question for Pima County. *[OCSD staff ask Pima County staff if they have identified the importance of a PPC corridor between the Altar Valley and the Greater Southlands. And, if so, ask where the corridor is located.]*

Trevor asked if anyone knows the status of the populations in Santa Cruz County and in Mexico through the Altar Valley. Marit said that PPC does not extend very far into Mexico based on her recollection of survey work performed by M. Baker. Leslie quoted the USFWS PPC 5-year Review, saying "It is geographically restricted to southeast Arizona, specifically the valley floors between the Baboquivari Mountains on the west and the Santa Rita Mountains to the east, and in low densities in the northern areas of Sonora, Mexico."

Trevor referred to C. Funicelli's recommendation for the addition of several more species of cacti to be added to the list of protected plants in the NPPO, agreeing with her recommendation. He said that he wasn't sure how developers would feel about this, but if this was only applied to areas in the Greater Southlands with PPC, that might make it more acceptable.

Leslie said that OCSD staff will draft a summary of the proposal she outlined based on the discussion and will send it to TAC members before the August meeting.

Rich said that one of the points C. McDonald raises is that areas of altered watercourses and eroded areas are not good areas for PPC protection. Rich added that the "backwards L" avoids eroded areas. Rich quoted part of one of C. McDonald's responses, "We do know what will not work for PPC conservation, including only relying on small reserves, altered watercourses that lead to eroded areas, competition with nonnative plants, areas without other cacti, conserving only a fraction of the PPC population, and areas without seed dispersers." Rich said that the seed disperser aspect needs to be described in more detail as part of a research question. He noted that density seems to be an important factor mentioned by respondents and so further research on optimum PPC density is important.

Leslie said that respondents were asked to assess the health of the population. She suggested rewording the question to read: "To the best of your understanding or ability, how would you characterize a healthy PPC population in the Greater Southlands HCP planning area in terms of optimum density, size, or age structure?" Guy thought this was a good follow-up question. Leslie asked about outside factors such as proximity to other cacti and suggested adding a second piece to the question so that it addressed habitat, with specific emphasis on reserve size(s). Trevor said that we already know answers to the habitat question, but it would be good to get more specifics – we want the presence of other cactus species, uneroded areas, no invasive grasses, or houses.

Guy said that this would help us to defend conservation strategies as being based on the best available science.

Dennis asked how non-native grasses pose a threat to PPC as he has observed PPC in areas infested with non-native grasses. Guy said that increased fire risk as well as altered water availability were both threats to PPC caused by non-native grasses.

With regard to conservation banks, Marit said that the USFWS cannot consider the entire area conserved until everything has been purchased for credit because the owner of the land could sell the unprotected portion at some point. Trevor wondered if there is a difference between a private conservation bank and one purchased by a public entity. In the case of Pima County, he thinks that they intend to place a conservation easement over the entire property prior to all of the credits being sold. Trevor recommended that OCSD staff ask Pima County staff how they are setting up the Madera Highlands mitigation bank. *[Action Item: OCSD staff ask Pima County staff how they are setting up the Madera Highlands mitigation bank.]* Trevor said that credits may only be necessary as building occurs anyway. Leslie said that if approval of the HCP hinges on the size of the reserve, this would not work (i.e., mitigate as development occurs).

5. Upcoming Meetings:

Trevor suggested inviting PPC question respondents to a future meeting to help answer questions and respond to a draft proposal. He also suggested that the TAC talk about the linkage between the Tortolita Mountains and Avra Valley at the next TAC meeting given that the day before will be an Arizona Wildlife Linkages Working Group meeting.

Rich said that he would like to send links on adaptive management to the TAC to read before an upcoming meeting so that there is some discussion prior to Dennis Kubly's visit on October 1.

6. Call to the Audience

Mike Cross said that results from Westland Resources, Inc.'s work vary from what Guy said during the meeting about the need to collect hundreds of thousands of seeds in order to establish one mature PPC plant. With 150 seeds, Mike said that fifty plants established after three years, which have been transplanted to the mitigation site. Guy said that these were grown in a nursery and not in the real world.

Trevor asked if those plants are in the ground now and Mike said yes. Trevor asked about the survivorship and Mike said he didn't know since no monitoring had been done to date. Mike said that they would love to follow-up and monitor the plants. Since they have only been in the ground a few months, perhaps there is still a way they can do it despite the difficult financial times the developer is currently facing. Amanda said that Pima County has asked Diamond Ventures to conduct a ten-year PPC study on propagated plants and will monitor survivorship. Also, they will plant PPC in varying substrate types throughout the property and create a ten-year study. Westland Resources, Inc. drafted the conceptual experimental design. Rich asked about

the cost for the study and Amanda said that she is working on that currently and, therefore, doesn't know. She said that the study area consists of 3,200 acres and the proposal will prescribe pedestrian surveys over a 20-year time period. Nurseries will also be set-up on site.

Trevor said that the TAC would be very interested in that work and it would be very helpful to see these cost estimates as the TAC considers conservation measures. Leslie said that anything that is submitted to Pima County for review is public record and so OCSD can request drafts of those. *[Action Item: OCSD staff request from Pima County documents related to PPC monitoring as part of the Swan Southlands development].*

7. Adjournment

The meeting was adjourned at 3:20 p.m.

Summary of Action Items:

- Regarding the Preliminary Draft HCP review by TAC members, Jamie will redistribute the sheet with brief instructions;
- OCSD staff will distribute Pima County's ordinance regarding off road vehicles and washes;
- OCSD staff ask Pima County staff if they have identified the importance of a PPC corridor between the Altar Valley and the Greater Southlands. And, if so, ask where the corridor is located;
- OCSD staff ask USFWS staff about the results of the PPC demographic study in Altar Valley;
- OCSD staff create a list of ongoing PPC research;
- OCSD staff ask Pima County staff how they are setting up the Madera Highlands mitigation bank;
- OCSD staff request from Pima County documents related to PPC monitoring as part of the Swan Southlands development.